NOTES ON THE LIFE HISTORY OF THE WESTERN XENICA *GEITONEURA MINYAS* (WATERHOUSE & LYELL) (LEPIDOPTERA: NYMPHALIDAE: SATYRINAE)

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Abstract

The life history of the Western Xenica, *Geitoneura minyas* (Waterhouse & Lyell), is described and illustrated. The introduced annual veldt grass *Ehrharta longiflora* Smith is a frequently used food plant at Wanneroo. The relationship between *G. minyas* and *G. klugii* (Guérin-Méneville) in southwestern Australia is discussed.

Introduction

The Western Xenica, *Geitoneura minyas* (Waterhouse & Lyell), is endemic to southwestern Australia (Braby 2000). It is locally common from near Albany (Burns 1951) and the Stirling Range (Common and Waterhouse 1981) north to Shark Bay and inland to the semi-arid zone around Paynes Find (Williams *et al.* 1993) and the Koolyanobbing Range (Williams *et al.* 1996).

In the northern part of its range *G. minyas* flies in August but further south, near Dunsborough and Albany, adults do not generally appear until October and continue flying until late November. Apart from the description of a larval head capsule and pupa based on colour transparencies (Braby 2000), its life history is poorly known. In this paper, its life history is described and compared with that of the closely related *G. klugii* (Guérin-Méneville).

Life history

Food plant. The introduced *Ehrharta longiflora* Smith (South African annual veldt grass) (Poaceae).

Egg (Fig. 1). Diameter 0.7 mm; dome-shaped, uniformly greenish-white when first laid, turning yellowish with variable pink markings after a few days; surface with 12-14 prominent vertical ribs culminating in a circular crown of raised projections around the apex; micropyle area flattened with an indistinct reticulated pattern of fine ridges.

First instar larva (Fig. 2). Length 2-5 mm. Head large and rounded, shiny black, faintly pitted and sparsely covered with long, curved pale setae rounded at tips. Body slender, cream in colour, with distinct pink-brown mid-dorsal line, two pink-brown dorsolateral lines and one usually broken ventrolateral line; a series of paired, long, curved black setae (Fig. 3) are

located along each side of mid-dorsal line as well as numerous shorter lateral setae; the tips of these setae are white and slightly clubbed; dorsal collar projections support forward curved black setae. As the larva grows it turns green and the pink-brown mid-dorsal and dorsolateral lines become less well defined.

Second instar larva. Length 5-9 mm. Head green, rounded, faintly pitted and sparsely covered with long black primary setae and shorter pale secondary setae; eyes small and black. Body long and slender, green in colour with darker green mid-dorsal line and two green dorsolateral lines; when viewed from above the strip between the dorsolateral lines appears yellowish green; paired black setae are located along each side of the mid-dorsal line and there are numerous shorter, white lateral setae; anal segment with short forked posterior projection.

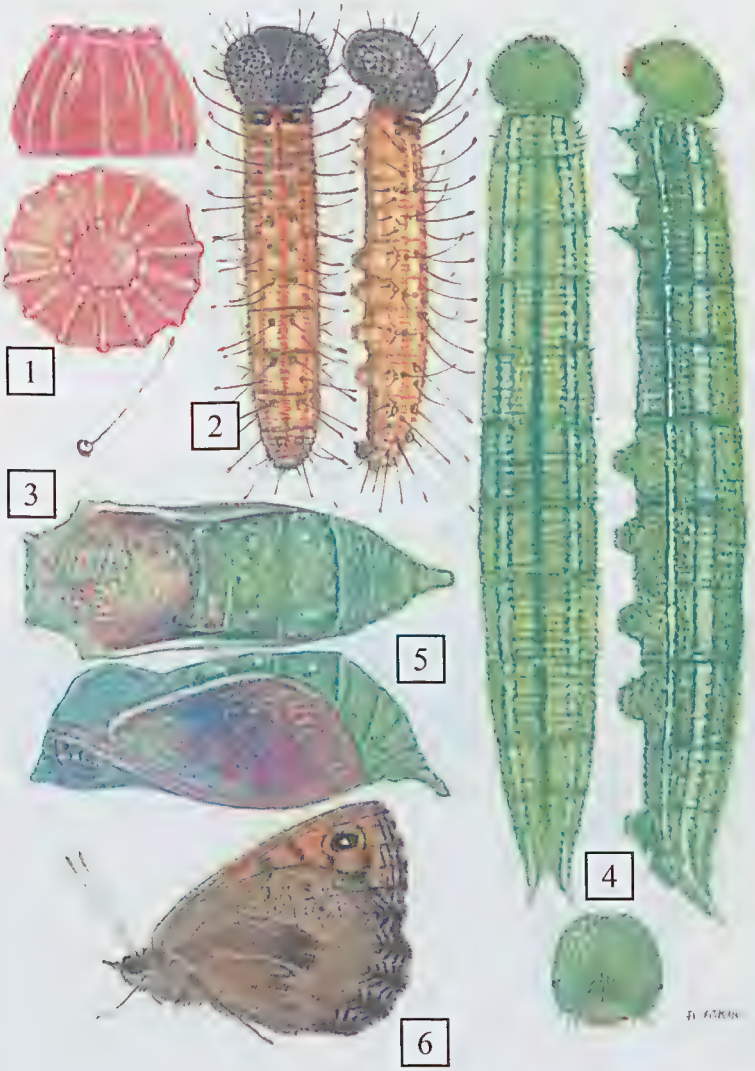
Third to final instar larva (Fig. 4). Length 10-26 mm. Head green; large and rounded; surface covered with small white nodules from which protrude fine black or pale, pointed setae. Body green; long and tapered; covered with very short, fine white setae; dorsal surface with occasional black, pointed setae; green sclerotised collar behind head supports longer, pointed black setae; there is a prominent, dark green mid-dorsal line and a narrow whitish dorsolateral line, edged darker green, which extends the length of the body, including sides of the forked posterior projection. Mature larvae have a narrow but distinct white ventrolateral line.

Pupa (Fig. 5). Length 11-12 mm. Colour variable, either green or greenish blue with pinkish-blue translucent wing cases, or brown; anterior end wedge shaped; thorax with pronounced dorsal ridge; dorsal margin of forewing with a cream longitudinal ridge edged above with dark brown; abdomen with a prominent cream transverse ridge on segment 4; segments 1-3 usually have a pair of indistinct whitish dorsolateral spots; posterior end with small round cremaster.

Observations

Around Perth, adult *G. minyas* (Fig. 6) fly from September to early November. In mid October 2006, we captured seven females near Wanneroo, 25 km north of Perth, in an area of woodland where the understorey was overgrown with the introduced annual veldt grass *E. longiflora*. These were placed in clear plastic food containers with some fresh veldt grass on which they laid their eggs. The eggs remained on the dry, shriveled grass throughout the summer. They were occasionally given a light misting of water to simulate periodic summer showers. Larvae did not develop until April 2007, at which time the dark larval heads became visible through the egg shell.

At the onset of the first autumn rains in early May, fresh veldt grass began to grow. Blades of this grass were placed in the egg containers and this



Figs 1-6. Juvenile stages and adult of *Geitoneura minyas* from Wanneroo, WA. (1) egg, lateral and dorsal views; (2) first instar larva, dorsal and lateral views; (3) first instar setae; (4) mature larva, dorsal and lateral views and frons of head; (5) pupa, dorsal and lateral views; (6) adult female, underside.

triggered an immediate hatching of first instar *G. minyas* larvae. Some larvae were reared indoors in plastic vials, where they were available for microscopic examination; others were transferred outdoors to potted *E. longiflora* tussocks for behavioural observations.

Larvae hatched from eggs by cutting out a circular hole or 'crown' in the top of the egg case. This 'crown' frequently fell back into place once the larva departed, leaving the empty egg case appearing intact. The egg cases were not consumed by the larvae. Larvae on potted veldt grasses fed during the day and at night. When not feeding they sheltered on the underside of a grass blade, usually in close proximity to their feeding scars. In windy conditions they sometimes retreated to more secure positions among the lower stems of the grass tussock. Larvae ate most of the leaf before moving to another grass blade.

Pupation occurred in September. Larvae pupated on the food plant, suspended head downwards by the cremaster. Pupal duration was 20 to 22 days, with adults emerging in late September and early October. A pre-emergence pupa is shown in Fig. 7. Larvae reared indoors developed much more rapidly than those outside, with the first adults emerging in August; this is no doubt due to the warmer conditions indoors.

Fig. 7. Photograph of pre-emergence pupa of *Geitoneura minyas* from Wanneroo, Western Australia.

Comparison with *G. klugii*

Structural differences were noted between the eggs of *G. minyas* and those of *G. klugii*. Twenty-one *G. minyas* eggs from Wanneroo had from 12 to 14 vertical ribs, whereas nineteen *G. klugii* eggs collected in 2005 at Garden Island, 15 km SSW of Fremantle, had from 14 to 16 ribs. The colour and patterning on the eggs of both species was very similar. In South Australia, *G. klugii* eggs were reported to have from 14 to 18 vertical ribs (Grund 2002). First instar larvae of both species are similar, although the dorsal and dorsolateral lines in *G. klugii* are generally more distinct.

Pupae of *G. minyas* and *G. klugii* are morphologically similar, although *G. klugii* pupae are usually larger than those of *G. minyas*. A series of *G. minyas* pupae from Wanneroo measured 11-12 mm in length, whereas *G. klugii* pupae from Garden Island were 11-13 mm. The paired abdominal segment spots are usually more distinct in *G. klugii*. At Wanneroo, *G. minyas* pupae were either green or brown but in *G. klugii* only green pupae have been recorded.

The reproductive strategies of both species in Western Australia are similar. Each has a delayed larval hatching, which coincides with the availability of new growth from their respective food plant grasses. Braby (2000) suggested that for *G. klugii* this delayed hatching, synchronized with the availability of new growth on the food plant following the autumn rains, may be a survival mechanism for coping with summer drought, when many grasses are dry and probably unpalatable to larvae (Braby and New 1988a, b).

Adult behaviour of the two species is also very similar. Female *G. minyas* mate once and, like *G. klugii*, reject further attempts from courting males by hovering close to the ground and beating their wings rapidly (Braby 2000). At Wanneroo, *G. minyas* and *G. klugii* readily visit white-flowered daisies in gardens adjacent to native bushland. They also visit the flower-spikes of the native grass-tree *Xanthorrhoea preissii* (Xanthorrhoeaceae). In eastern Australia, adult *G. klugii* seldom feed from flowers but have been observed feeding on sap of *Acacia* and *Eucalyptus* (Braby 2000).

On mainland Western Australia, *G. minyas* and *G. klugii* frequently occur together; however, only *G. klugii* has been recorded on off-shore islands (Williams 1997, Williams and Powell 2000, 2006, Powell and Williams 2007). On both Garden and Rottnest islands *G. klugii* is abundant, as is its larval food plant *Austrostipa flavescens* (Poaceae). In contrast, the introduced veldt grass *Ehrharta longiflora*, on which *G. minyas* is known to feed, is either absent or uncommon on these islands. The native food plant for *G. minyas* is unknown.

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